SEC Fingerprinting of Polyvinyl Alcohols

Application Note

Authors

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Introduction

Three samples of polyvinyl alcohol were analyzed by aqueous SEC using Agilent PL aquagel-OH columns. These columns combine high pore volume and high column efficiency (>35,000 plates/meter) for maximum resolution. The calculated molecular weight averages were compared with manufacturers' quoted viscosity values. Calibration was done using pullulan polysaccharides.

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Conditions

Samples: Three polyvinyl alcohols
Columns: 2 x PL aquagel-OH 40 8 µm, 300 x 7.5 mm (p/n PL1149-6840)
Eluent: 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7
Flow Rate: 1.0 mL/min
Detection: RI

Results and Discussion

Sample	Viscosity (mPa.s)	Mn	Mw
A	4	9771	29,470
B	10	23,339	80,174
C	20	31,210	102,309

Figure 1 is a chromatogram of one of the samples and Figure 2 shows overlaid molecular weight distributions of all three samples. Molecular weight distribution overlays provide a convenient method of fingerprinting for quality control and are more informative in production control and end-use performance evaluation than are single point viscosity measurements.

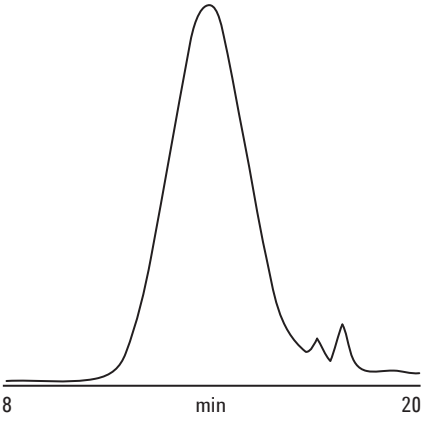

Figure 1. Raw data chromatogram of poly 2-vinyl pyridine

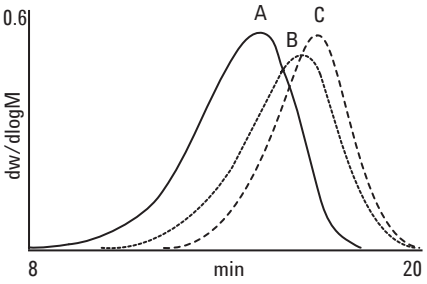

Figure 2. Comparison of molecular weights of three polyvinyl alcohols

Conclusion

Size exclusion chromatography using PL aquagel-OH columns highlighted the advantages of molecular weight values over single point viscosity measurements in the analysis of polyvinyl alcohols. Aqueous SEC also provides information on the polydispersity and the shape of the molecular weight distribution. The excellent chemical and mechanical stability of these columns offer high performance with good repeatability and column lifetime.

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